19-3265; Rev 0; 5/04



双输出、多模式、CD-RW/DVD激光二极管驱动器

MAX9483/MAX9484

概述

MAX9483/MAX9484是高性能、多模式激光二极管驱动器 (LDD)，专为 CD和 DVD组合拾取头而设计。该驱动器具有三个输入通道、一个RF振荡器以及两路精密电流放大器输出，用来驱动 CD和 DVD激光二极管。通过选择写控制信号和输入通道中的输入电流，MAX9483/MAX9484可支持多种 CD和 DVD读/写标准，例如CD-R/RW、DVD-R、DVD+R、DVD-RW、DVD+RW和DVD-RAM。峰值总输出电流为400mA，各通道的电流增益为 100。利用外接电阻可设定振荡频率和输出振幅。MAX9484还增加了一个外接电阻引脚，允许单独设定两路输出的振荡频率。另外，MAX9484能够接受低压差分信号 (LVDS)模式或单端模式的写控制信号，以获得可靠的高速写操作。

MAX9483采用 16引脚 QSOP封装和 4mm x 4mm、16引脚的薄型 QFN封装。MAX9484采用 4mm x 4mm、20引脚的薄型 QFN封装。两款芯片的额定工作条件为 4.5V至5.5V电源和0°C至 +70°C温度范围。

应用

CD-RW和 DVD组合激光二极管驱动器：
CD-R/RW、DVD-R、DVD+R、DVD-RW、
DVD+RW和 DVD-RAM

DVD录像机

大功率、高速激光写装置驱动器

特性

- 具有三个控制电流通道的双输出端口
- 支持多种激光二极管驱动器标准：
  CD-R/RW、DVD-R、DVD+R、DVD-RW、
  DVD+RW、DVD-RAM和 DVD视频
- MAX9483的引脚和功能与 ATMEL T0806兼容
- 两个输出口独立设定频率 (MAX9484)
- 可接受差分 (LVDS)或单端输入的写数据 (MAX9484)
- 使能控制
- 振幅高达 270mA的大读取电流
- 总电流为 400mA的高峰值写电流
- 可调节调制频率，从 100MHz至 600MHz
- 极快的输出电流脉冲上升和下降时间：1.0ns (典型值)
- 4.5V至 5.5V的单电源电压
- 无需外部基准时钟
- 0°C至 +70°C的商业级温度范围

引脚配置

TOP VIEW

Pin	Name	Pin	Name
1	IN1	16	V_{CC}
2	IN2	15	OUT1
3	IN3	14	GND
4	R_F	13	R_{S1}
5	NE2	12	R_{S2}
6	NE3	11	OUT2
7	ENABLE	10	OUTSEL
8	ENOSC	9	V_{CC}

MAXIM MAX9483

QSOP

Pin Configurations continued at end of data sheet.

定购信息

PART	TEMP RANGE	PIN-PACKAGE
MAX9483CEE	0°C to +70°C	16 QSOP
MAX9483CTE*	0°C to +70°C	16 Thin QFN
MAX9484CTP	0°C to +70°C	20 Thin QFN

*未来产品—供货状况请联络厂方。

双输出、多模式、CD-RW/DVD激光二极管驱动器

ABSOLUTE MAXIMUM RATINGS

V_{CC}, $V_{CCO_}$ to GND ....-0.3V to +6.0V
IN_, $R_{F_}$, $R_{S_}$ to GND.................................-0.3V to (V_{CC} + 0.3V)
ENABLE, ENOSC, NE2_, NE3_,
OUTSEL to GND....................................-0.3V to (V_{CC} + 0.3V)
Output Voltage at OUT1, OUT2......................-0.3V to (V_{CC} - 1V)
Continuous Power Dissipation (T_A = +70°C)
QSOP (derate 8.3mW/°C above +70°C)........................667mW
TQFN (derate 16.9mW/°C above +70°C).....................1349mW
Junction Temperature...+150°C
Storage Temperature Range ....-65°C to +150°C
ESD Rating (Human Body Model) ....≥ ±2.0kV
Lead Temperature (soldering, 10s) ....+300°C

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

DC ELECTRICAL CHARACTERISTICS

(V_{CC} = $V_{CCO_}$ = +4.5V to +5.5V, R_L = 6.8Ω, ENABLE = high, NE2 = NE3 = high (MAX9483), NE2_ = NE3_ = differential high (MAX9484), ENOSC = low, T_A = 0°C to +70°C, unless otherwise noted. Typical values are at V_{CC} = $V_{CCO_}$ = +5V, T_A = +25°C.) (Notes 1, 2, 4)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
POWER SUPPLY							
Write-Mode Supply Current	I_{CC1}	I_{IN1} = I_{IN2} = I_{IN3} = 500µA, NE2 = NE3 = low	MAX9483		181	200	mA
			MAX9484		182	210	
Read-Mode Supply Current	I_{CC2}	Oscillator enabled, I_{IN1} = I_{IN2} = I_{IN3} = 500µA, ENOSC = high, R_S = 8.2kΩ, R_F = 6.8kΩ	MAX9483		91	100	mA
			MAX9484		92	105	
		Oscillator disabled, I_{IN1} = I_{IN2} = I_{IN3} = 500µA	MAX9483		82	95	
			MAX9484		83	95	
Supply Current	I_{CC3}	Input disabled, I_{IN1} = I_{IN2} = I_{IN3} = 0	MAX9483		14	20	mA
			MAX9484		14	20	
Power-Down Supply Current	I_{CC4}	ENABLE = NE2 = NE3 = low, I_{IN1} = I_{IN2} = I_{IN3} = 0	MAX9483		0.96	2.0	mA
			MAX9484		1.2	2.0	
DIGITAL INPUTS FOR WRITE CHANNEL CONTROL (NE2, NE3) (MAX9483)							
High-Level Input Voltage	V_{IH1}			2.0			V
Low-Level Input Voltage	V_{IL1}					0.8	V
Input Current	I_{IN1}	V_{IN} = high or low		-20		+20	µA
LVDS DIGITAL INPUTS FOR WRITE CHANNEL CONTROL (NE2_, NE3_) (MAX9484)							
Differential Input High Threshold	V_{TH}					50	mV
Differential Input Low Threshold	V_{TL}			-50			mV
SINGLE-ENDED DIGITAL INPUTS FOR WRITE CHANNEL CONTROL (NE2+, NE3+) (MAX9484)							
Reference Voltage	V_{REF}			1.10	1.25	1.40	V
High-Level Input Voltage	V_{IH2}			V_{REF} + 300			mV
Low-Level Input Voltage	V_{IL2}					V_{REF} - 300	mV
Input Current	I_{IN2}	V_{IN} = high or low		-20		+20	µA

DC ELECTRICAL CHARACTERISTICS (continued)

(V_{CC} = $V_{CCO_}$ = +4.5V to +5.5V, R_L = 6.8Ω, ENABLE = high, NE2 = NE3 = high (MAX9483), NE2_ = NE3_ = differential high (MAX9484), ENOSC = low, T_A = 0°C to +70°C, unless otherwise noted. Typical values are at V_{CC} = $V_{CCO_}$ = +5V, T_A = +25°C.) (Notes 1, 2, 4)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DIGITAL INPUTS FOR CONTROL SIGNALS (ENABLE, OUTSEL, ENOSC)						
High-Level Input Voltage	V_{IH3}		2.0			V
Low-Level Input Voltage	V_{IL3}				0.8	V
Input Current	I_{IN3}	V_{IN} = high or low	-10		+10	µA
ANALOG INPUTS (IN1, IN2, IN3)						
Current Channel Input Current Range	I_{CIN}	Current flowing into IN1, IN2, or IN3	0		4.0	mA
Current Channel Input Impedance	R_{IN}	IN_ to GND	165	200	235	Ω
OUTPUTS (OUT1 and OUT2)						
Maximum Total Output Current	I_{OUT}		320	400		mA
Maximum Output Current per Channel	I_{OUT}	Read current IN1	210	273		mA
		Write current IN2, IN3	250	347		
Best-Fit Current Gain	A_I	Any channel (Note 3)		100		I/I
Best-Fit Current Offset	I_{OFFSET}	Any channel (Note 3)	-4		+4	mA
Output Current Linearity		Any channel (Note 3)	-3		+3	%
Output Off Current	I_{OFF1}	ENABLE = low		0.2	1	mA
	I_{OFF2}	NE2 = NE3 = high, I_{IN1} = 0µA, I_{IN2} = I_{IN3} = 500µA		0.22	1.5	
	I_{OFF3}	NE2 = NE3 = low, I_{IN1} = I_{IN2} = I_{IN3} = 0µA		0.14	5	
Read-Mode Output Supply Sensitivity		I_{OUT} = 40mA	-2		+2	%/V
Write-Mode Output Supply Sensitivity		I_{OUT} = 80mA	-2		+2	%/V
Read-Mode Output Temperature Sensitivity		I_{OUT} = 40mA		15		ppm°C
Write-Mode Output Temperature Sensitivity		I_{OUT} = 80mA		16		ppm°C
Output Noise		I_{OUT} = 40mA, ENOSC = low		3		nA/√Hz

双输出、多模式、CD-RW/DVD激光二极管驱动器

AC ELECTRICAL CHARACTERISTICS

(V_{CC} = $V_{CCO_}$ = +4.5V to +5.5V, I_{OUT} = 40mA (read) + 40mA, R_L = 6.8Ω, ENABLE = high, NE2 = NE3 = high (MAX9483), NE2_ = NE3_ = differential high (MAX9484), ENOSC = low, T_A = 0°C to +70°C, unless otherwise noted. Typical values are at V_{CC} = $V_{CCO_}$ = +5V, T_A = +25°C.) (Notes 1, 4)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
OSCILLATOR						
Oscillator Frequency	f_{OSC}	$R_{F_}$ = 7.5kΩ (Note 2), I_{OUT} = 40mA (read)	255	300	350	MHz
Oscillator Temperature Coefficient		$R_{F_}$ = 7.5kΩ		10		ppm/°C
OUTPUT TIMING						
Write Rise Time	t_r	I_{OUT} = 40mA (read) + 40mA (10% to 90%)		0.9	1.6	ns
Write Fall Time	t_f	I_{OUT} = 40mA (read) + 40mA (90% to 10%)		1.0	1.6	ns
Output-Current Overshoot	OCO			5		%
Output ON Propagation Delay	t_{ON}	NE 50% high-low to IOUT at 50% of final value		1.0	2.0	ns
Output OFF Propagation Delay	t_{OFF}	NE 50% low-high to IOUT at 50% of final value		1.0	2.0	ns
Output Disable Time	t_{DIS}	ENABLE 50% high-low to I_{OUT} at 50% of final value at I_{OUT} = 40mA (read)		60	100	ns
Output Enable Time	t_{EN}	ENABLE 50% low-high to I_{OUT} at 50% of final value at I_{OUT} = 40mA (read)		60	100	ns
Oscillator Disable Time	t_{DISO}	ENOSC 50% high-low to I_{OUT} at 50% of final value at I_{OUT} = 40mA (read)		4	10	ns
Oscillator Enable Time	t_{EHO}	ENOSC 50% high-low to I_{OUT} at 50% of final value at I_{OUT} = 40mA (read)		25	50	ns
Channel-Select Delay	t_{ODH}	OUTSEL 50% low-high to I_{OUT} at 50% of final value measured at OUT1		2.9	10	ns
	t_{ODL}	OUTSEL 50% high-low to I_{OUT} at 50% of final value measured at OUT2		2.9	10	

Note 1: Current into a pin is defined as positive. Current out of a pin is defined as negative. All voltages are referenced to ground except V_{TH}.

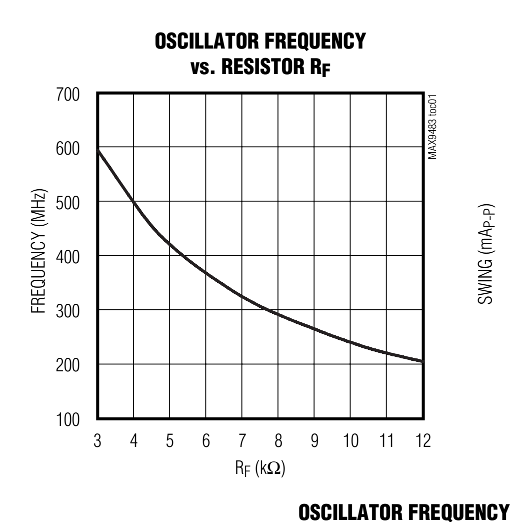
Note 2: Maximum and minimum limits over temperature are guaranteed by design and characterization. Devices are production tested at T_A = +25°C.

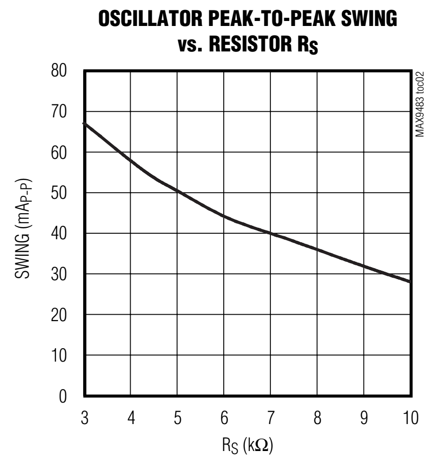
Note 3: Linearity of the amplifier is calculated using a best-fit method at three operating points of I_{OUT} at 20mA, 40mA, and 60mA. I_{OUT} = (I_{IN} x GAIN) + I_{OFFSET}.

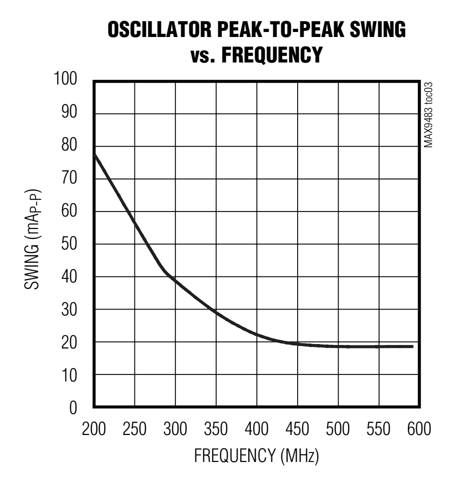
Note 4: Guaranteed by design and characterization. Limit set at ±6 sigma.

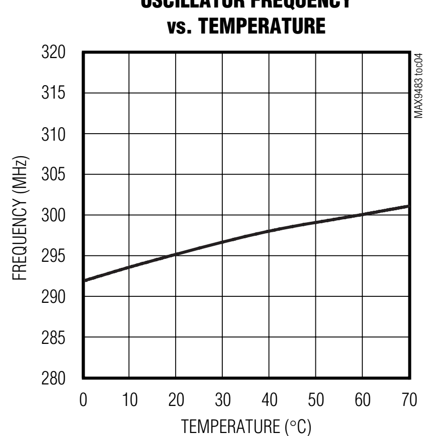
典型工作特性

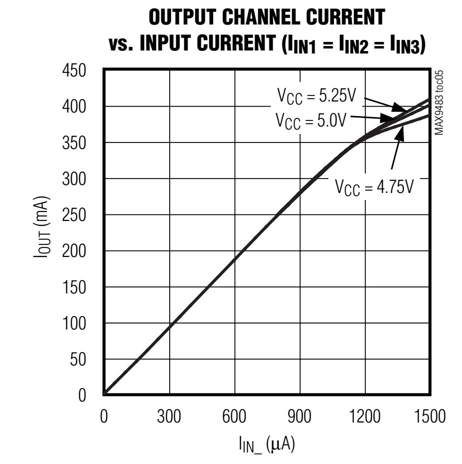
(V_{CC} = $V_{CCO_}$ = +5V, T_A = +25°C, unless otherwise noted.)

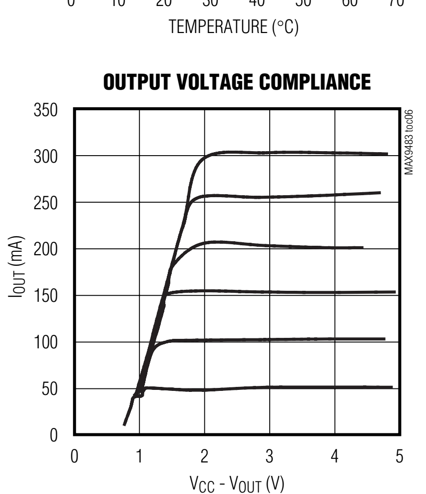


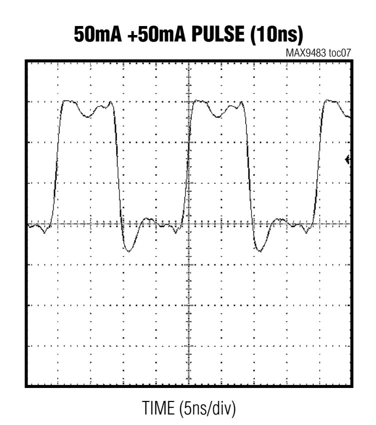












引脚说明

引脚			名称	功能
MAX9483		MAX9484		
QSOP	TQFN	TQFN		
1	15	18	IN1	通道1输入电流 (读通道)
2	16	19	IN2	通道2输入电流 (写通道)
3	1	20	IN3	通道3输入电流 (写通道)
4	2	—	R_F	振荡器频率设定电阻。外接一只电阻至GND，设定两路输出OUT1和OUT2的振荡器频率。
5	3	—	NE2	通道2低电平有效数字控制输入
6	4	—	NE3	通道3低电平有效数字控制输入
7	5	8	ENABLE	LVTTL输出电流使能
8	6	9	ENOSC	LVTTL振荡器使能
9, 16	14	17	V_{CC}	+5V电源。连接0.1μF和0.01μF的旁路电容至GND，0.01μF电容应该尽可能靠近该引脚。
10	8	11	OUTSEL	LVTTL输出选择。拉高则选择输出1；拉低则选择输出2。
11	9	12	OUT2	输出电流2
12	10	13	R_{S2}	输出2振荡器电流振幅设定电阻。外接一只电阻至GND，设定输出端口2的电流振幅。
13	11	14	R_{S1}	输出1振荡器电流振幅设定电阻。外接一只电阻至GND，设定输出端口1的电流振幅。
14	—	—	GND	地
15	12	15	OUT1	输出电流1
—	—	1	R_{F1}	输出1振荡器频率设定电阻。外接一只电阻至GND，设定OUT1的振荡器频率。
—	—	2	R_{F2}	输出2振荡器频率设定电阻。外接一只电阻至GND，设定OUT2的振荡器频率。
—	—	3	NE2+	通道2同相LVDS或单端数字控制输入
—	—	4	NE2-	通道2反相LVDS或单端数字控制输入参照端
—	—	6	NE3+	通道3同相LVDS或单端数字控制输入
—	—	7	NE3-	通道3反相LVDS或单端数字控制输入参照端
—	7	10	V_{CCO2}	输出2的+5V电源。连接0.1μF和0.01μF的旁路电容至GND，0.01μF电容应该尽可能靠近该引脚。
—	13	16	V_{CCO1}	输出1的+5V电源。连接0.1μF和0.01μF的旁路电容至GND，0.01μF电容应该尽可能靠近该引脚。
—	—	5	REF	单端输入的基准电压。连接0.1μF退耦电容至地。
—	EP	EP	EP	裸露垫盘。连接至地。

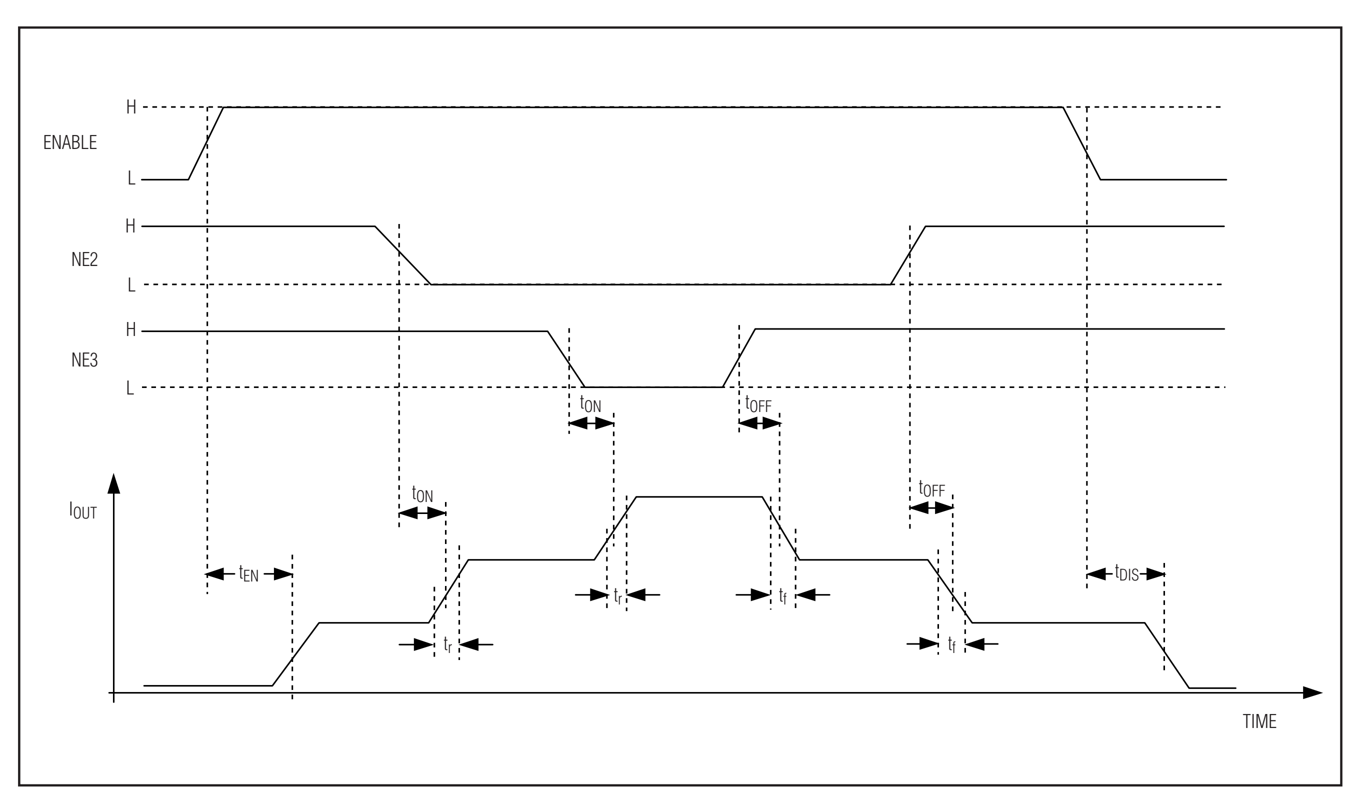


图1. 输出与控制信号时序图

详细说明

读通道和写通道

MAX9483/MAX9484高性能、多模式 LDD专为 CD和DVD组合拾取头而设计。该驱动器具有三个电流通道。每个通道有一个电流输入IN_(_=1、2或 3)和一个通道控制信号 (ENABLE、NE2或 NE3)。IN1为读通道提供基准，这个通道为激光器提供读电流或偏置电流。另外两个通道是写通道。这两个通道的电流叠加在读电流之上，在写模式下，读电流作为激光器的偏置电流使用。偏置电流明显减少了激光器输出的上升时间。当ENABLE为低时，三个通道全部被禁用。将 ENABLE拉高，则读通道有效，而其他两个写通道由 NE2和 NE3控制 (请参见图 1)。通过选择 IN2和 IN3的输入电流，以及NE2和 NE3的信号时序，驱动器可产生满足不同 CD/DVD写标准的多种电流波形。所有三个通道的电流增益都为100倍。每个输出能提供的最大总电流为400mA。

RF振荡器

为降低读模式中的激光模式跳跃噪声，利用频率为100MHz至 600MHz的振荡器来调制读电流。外接一只电阻，R_F，可确定振荡器频率。对于 MAX9484，可外接两只电阻，R_{F1}和 R_{F2}，分别选择 CD和 DVD激光器的振荡器频率。振荡电流的振幅由两只外接电阻，R_{S1}和R_{S2}，来设定，一只用于 CD，另一只用于 DVD。当ENABLE和 ENOSC均被拉高时，振荡器有效。

双输出、多模式、CD-RW/DVD激光二极管驱动器

应用信息

MAX9484的 LVDS输入

MAX9484的输入控制信号，NE2_和 NE3_，兼容于标准的 LVDS或单端输入。LVDS输入允许驱动器处理速率更高的数据写操作。当使用单端输入信号时，如 LVTTL或 SSTL_2，则将NE2-和 NE3-连接到 REF。

激光安全和 IEC 825

仅依靠 MAX9483/MAX9484激光驱动器不能确保所设计的发送器能够遵从 IEC 825标准。必须综合考虑整个发送器电路和器件的选择。用户必须明确他们的应用所要求的容错级别。请注意，Maxim产品并没有被设计或认证用于人体植入系统、生命支持和维持系统或任何其他可能会因 Maxim产品的失效而导致人身伤亡的系统中。

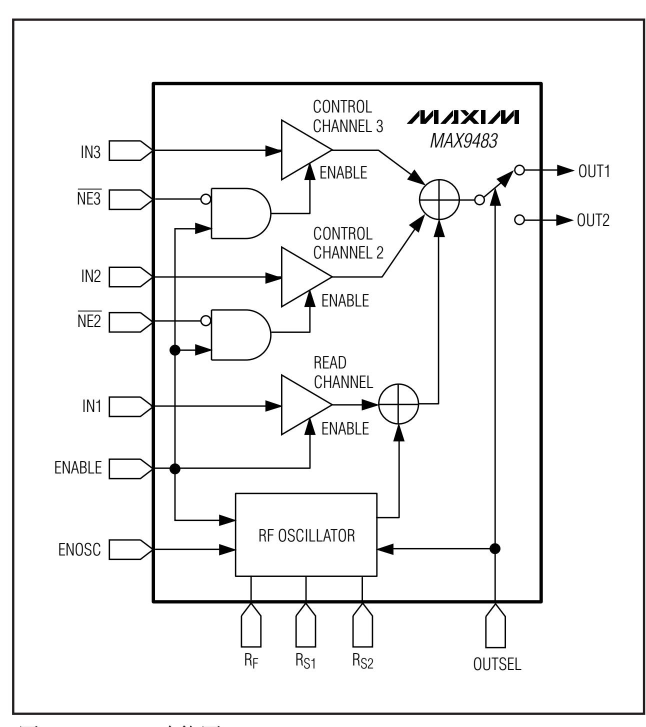


图2. MAX9483 功能图

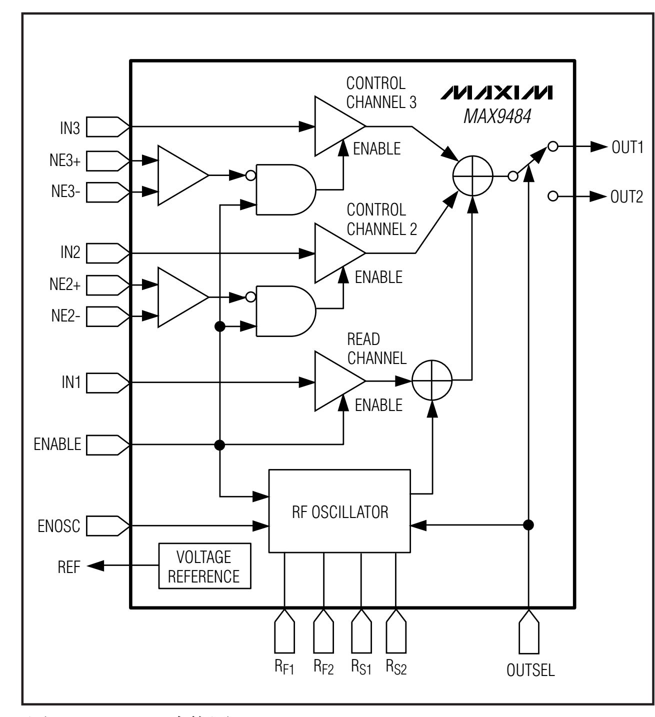


图3. MAX9484 功能图

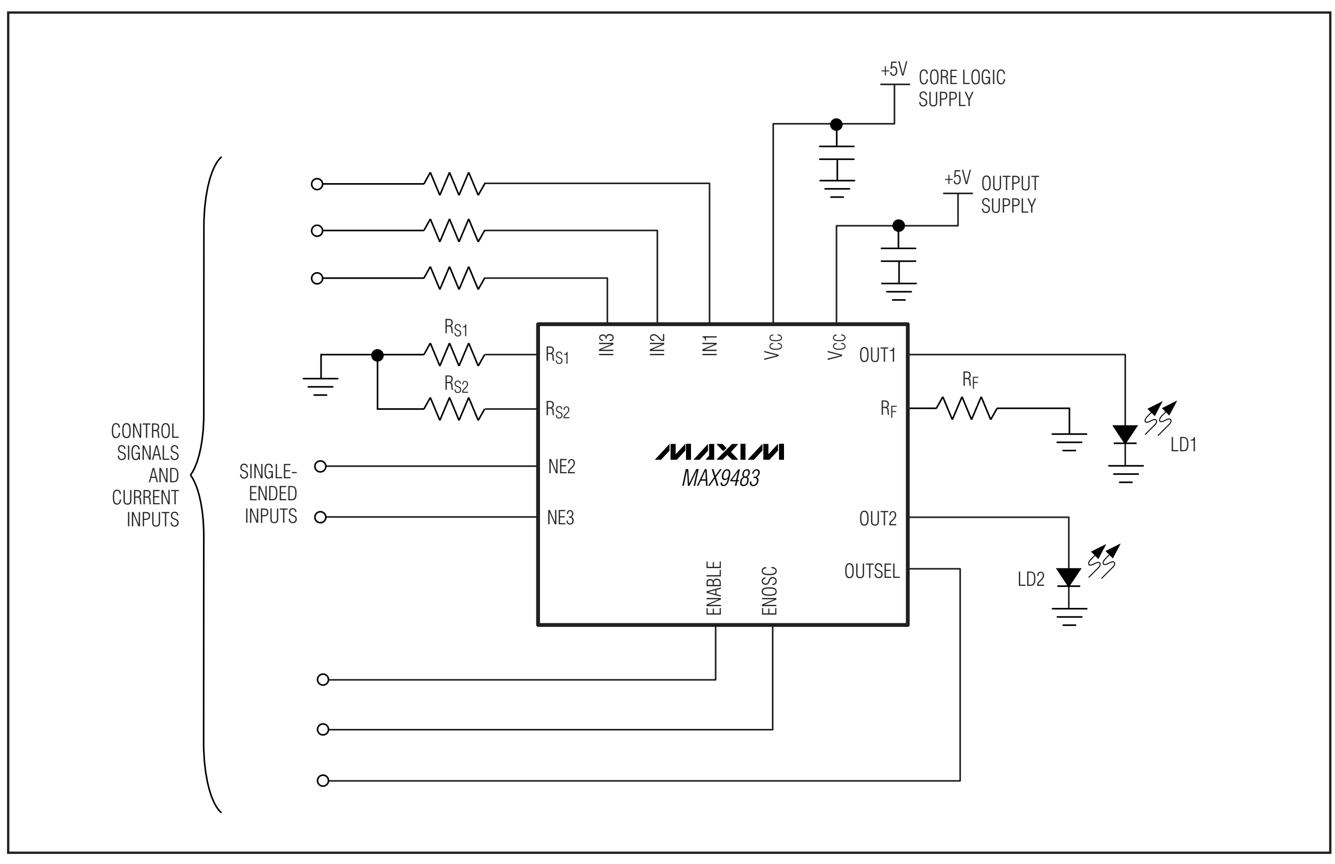


图4. MAX9483典型工作电路图

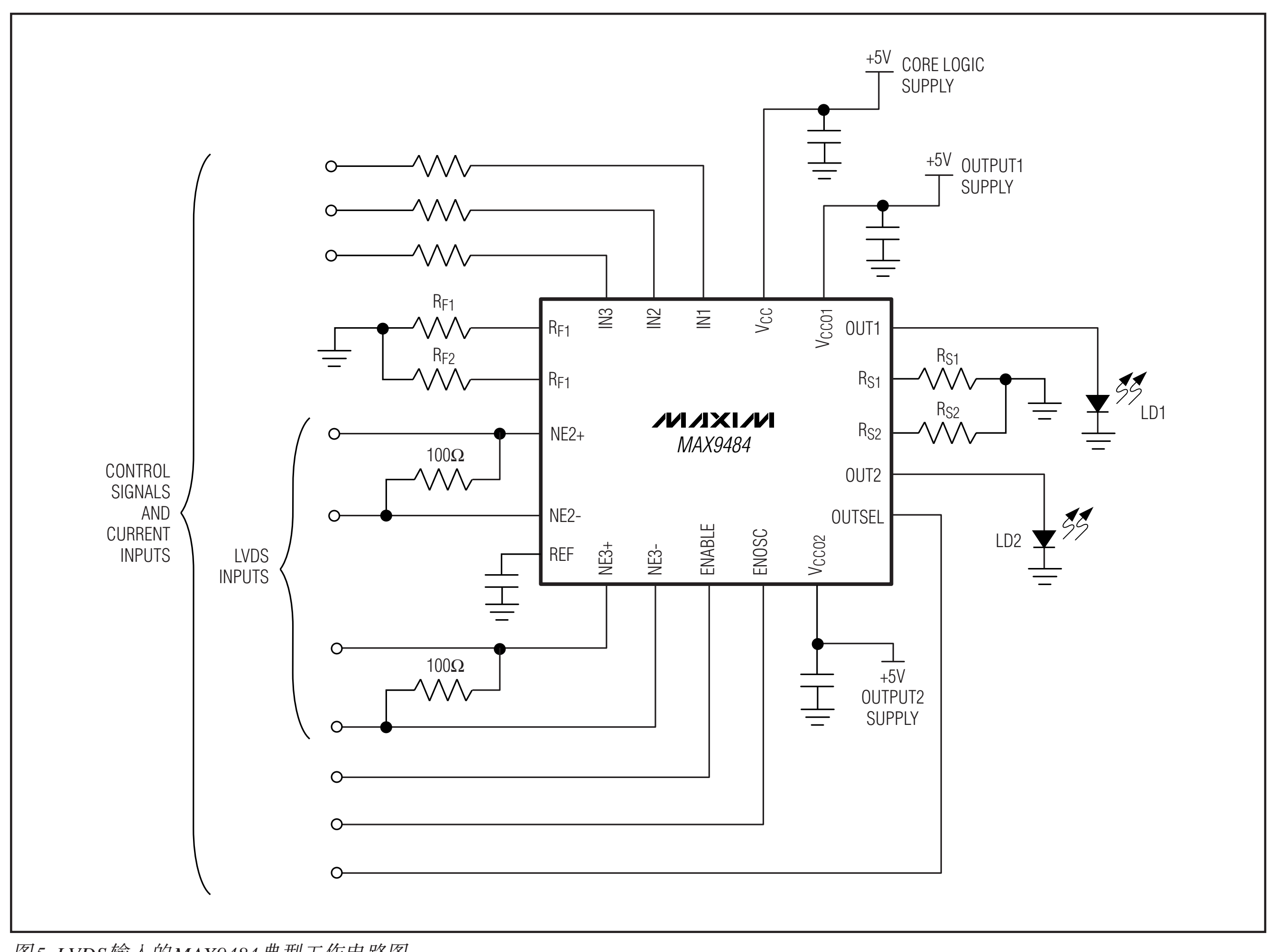


图5. LVDS输入的MAX9484典型工作电路图

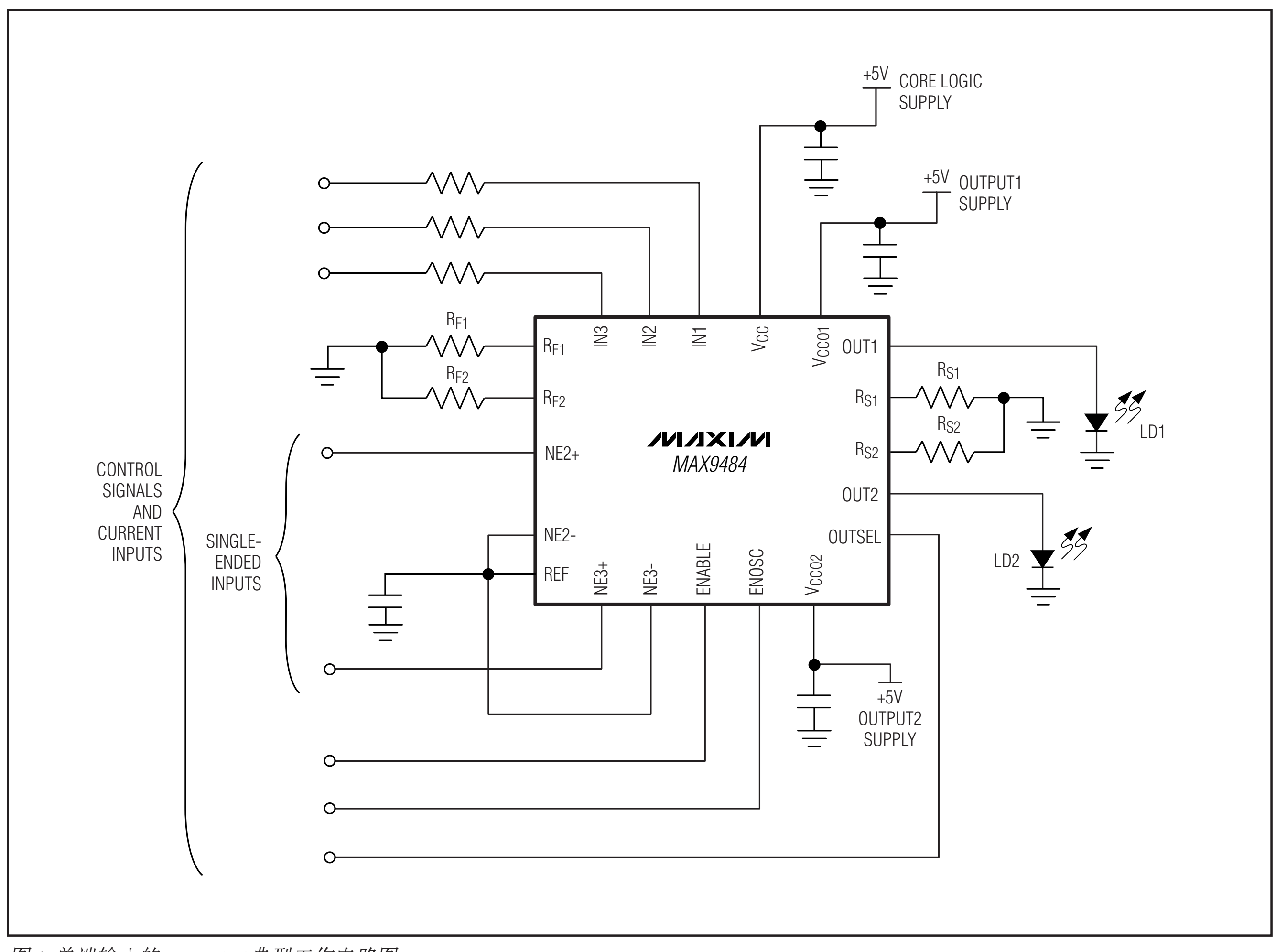
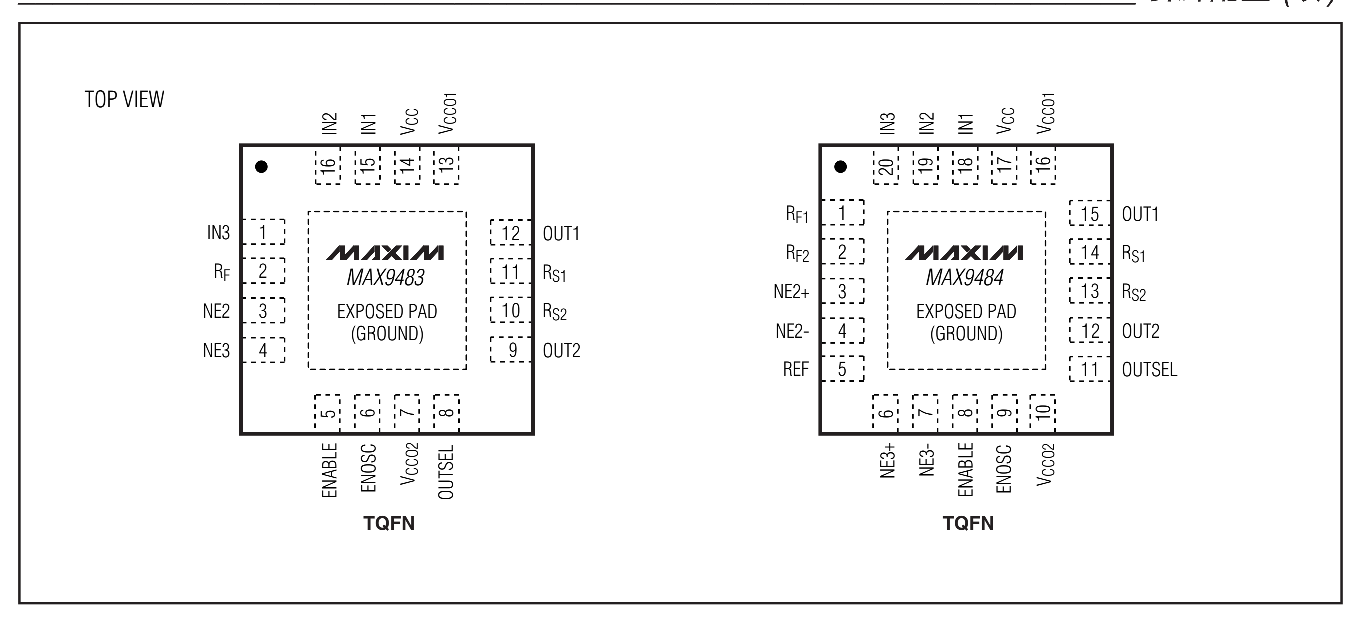


图6. 单端输入的MAX9484典型工作电路图

引脚配置 (续)

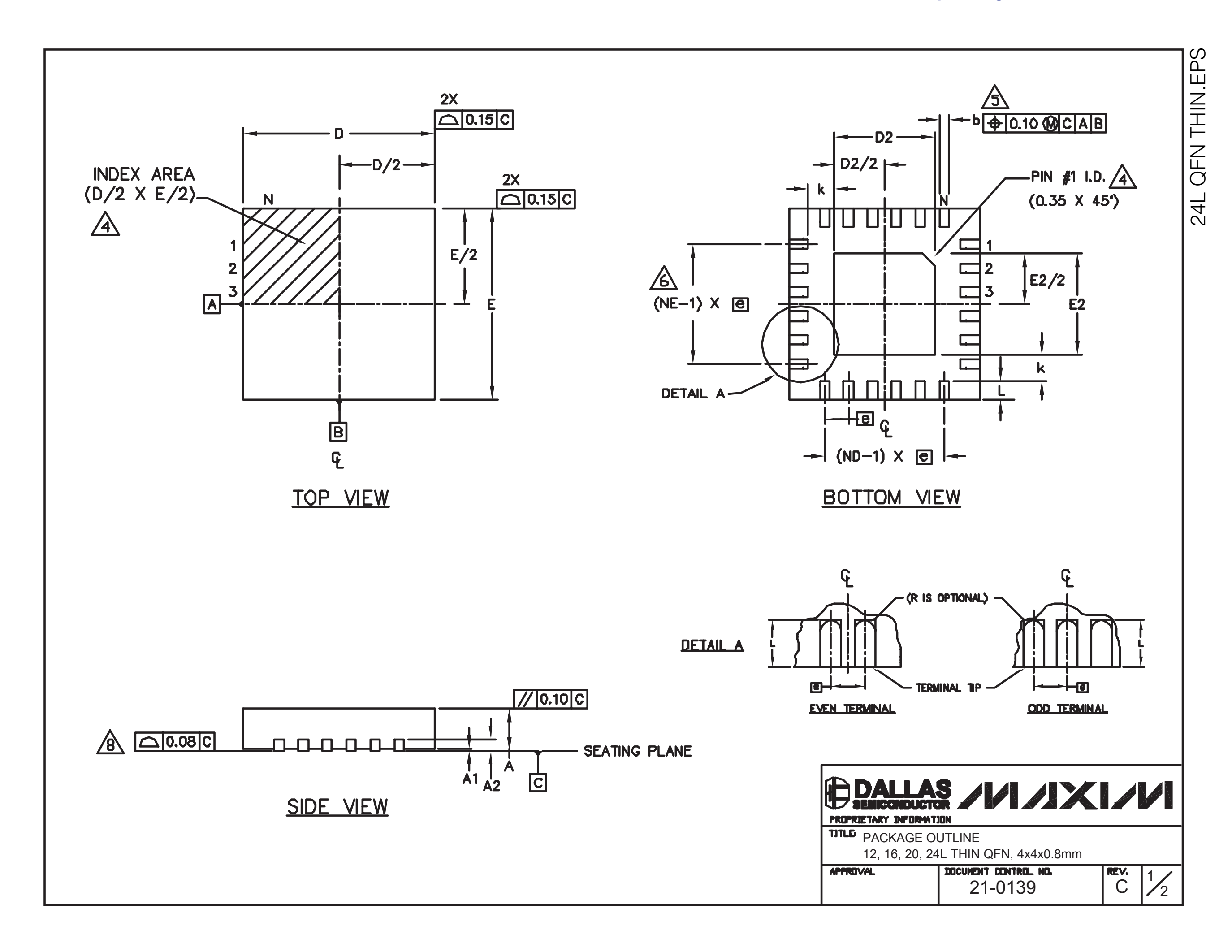


芯片信息

TRANSISTOR COUNT: 1399

封装信息

(本数据资料提供的封装图可能不是最近的规格，如需最近的封装外型信息，请查询 **www.maxim-ic.com/packages**。)



(本数据资料提供的封装图可能不是最近的规格，如需最近的封装外型信息，请查询 www.maxim-ic.com/packages。)

COMMON DIMENSIONS

PKG	12L 4x4			16L 4x4			20L 4x4			24L 4x4		
REF.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.70	0.75	0.80	0.70	0.75	0.80	0.70	0.75	0.80
A1	0.0	0.02	0.05	0.0	0.02	0.05	0.0	0.02	0.05	0.0	0.02	0.05
A2	0.20 REF			0.20 REF			0.20 REF			0.20 REF		
b	0.25	0.30	0.35	0.25	0.30	0.35	0.20	0.25	0.30	0.18	0.23	0.30
D	3.90	4.00	4.10	3.90	4.00	4.10	3.90	4.00	4.10	3.90	4.00	4.10
E	3.90	4.00	4.10	3.90	4.00	4.10	3.90	4.00	4.10	3.90	4.00	4.10
e	0.80 BSC.			0.65 BSC.			0.50 BSC.			0.50 BSC.		
k	0.25	-	-	0.25	-	-	0.25	-	-	0.25	-	-
L	0.45	0.55	0.65	0.45	0.55	0.65	0.45	0.55	0.65	0.30	0.40	0.50
N	12			16			20			24		
ND	3			4			5			6		
NE	3			4			5			6		
Jedec Var.	WGGB			WGGC			WGGD-1			WGGD-2		

EXPOSED PAD VARIATIONS

PKG. CODES	D2			E2			DOWN BONDS ALLOWED
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
T1244-2	1.95	2.10	2.25	1.95	2.10	2.25	NO
T1244-3	1.95	2.10	2.25	1.95	2.10	2.25	YES
T1244-4	1.95	2.10	2.25	1.95	2.10	2.25	NO
T1644-2	1.95	2.10	2.25	1.95	2.10	2.25	NO
T1644-3	1.95	2.10	2.25	1.95	2.10	2.25	YES
T1644-4	1.95	2.10	2.25	1.95	2.10	2.25	NO
T2044-1	1.95	2.10	2.25	1.95	2.10	2.25	NO
T2044-2	1.95	2.10	2.25	1.95	2.10	2.25	YES
T2044-3	1.95	2.10	2.25	1.95	2.10	2.25	NO
T2444-1	2.45	2.60	2.63	2.45	2.60	2.63	NO
T2444-2	1.95	2.10	2.25	1.95	2.10	2.25	YES
T2444-3	2.45	2.60	2.63	2.45	2.60	2.63	YES
T2444-4	2.45	2.60	2.63	2.45	2.60	2.63	NO

NOTES:

1. DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.
3. N IS THE TOTAL NUMBER OF TERMINALS.
4. THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JESD 95-1 SPP-012. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.
5. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.25 mm AND 0.30 mm FROM TERMINAL TIP.
6. ND AND NE REFER TO THE NUMBER OF TERMINALS ON EACH D AND E SIDE RESPECTIVELY.
7. DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION.
8. COPLANARITY APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.
9. DRAWING CONFORMS TO JEDEC MO220, EXCEPT FOR T2444-1, T2444-3 AND T2444-4.



PROPRIETARY INFORMATION

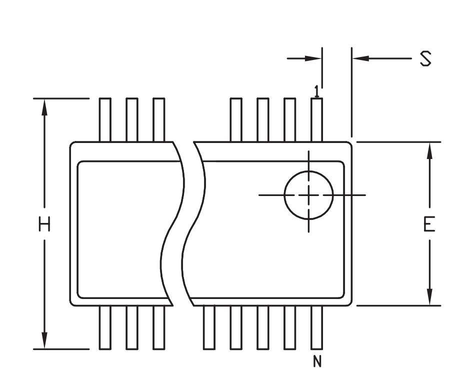
TITLE: PACKAGE OUTLINE
12, 16, 20, 24L THIN QFN, 4x4x0.8mm

APPROVAL | DOCUMENT CONTROL NO. 21-0139 | REV. C | 2/2

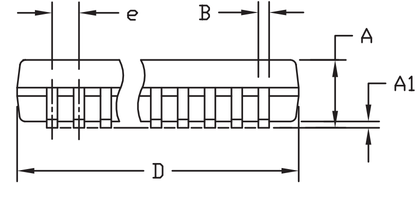
封装信息 (续)

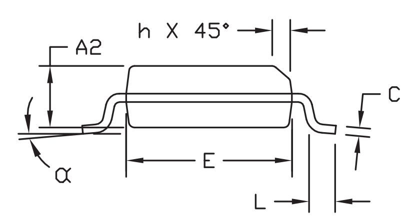
(本数据资料提供的封装图可能不是最近的规格，如需最近的封装外型信息，请查询 **www.maxim-ic.com/packages**。)

QSOP.EPS



DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.061	.068	1.55	1.73
A1	.004	.0098	0.102	0.249
A2	.055	.061	1.40	1.55
B	.008	.012	0.20	0.30
C	.0075	.0098	0.191	0.249
D	SEE VARIATIONS			
E	.150	.157	3.81	3.99
e	.025 BSC		0.635 BSC	
H	.230	.244	5.84	6.20
h	.010	.016	0.25	0.41
L	.016	.035	0.41	0.89
N	SEE VARIATIONS			
α	0°	8°	0°	8°





VARIATIONS:

	INCHES MIN.	INCHES MAX.	MILLIMETERS MIN.	MILLIMETERS MAX.	N	
D	.189	.196	4.80	4.98	16	AB
S	.0020	.0070	0.05	0.18		
D	.337	.344	8.56	8.74	20	AD
S	.0500	.0550	1.270	1.397		
D	.337	.344	8.56	8.74	24	AE
S	.0250	.0300	0.635	0.762		
D	.386	.393	9.80	9.98	28	AF
S	.0250	.0300	0.635	0.762		

NOTES:
1). D & E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2). MOLD FLASH OR PROTRUSIONS NOT TO EXCEED .006" PER SIDE.
3). CONTROLLING DIMENSIONS: INCHES.
4). MEETS JEDEC MO137.

DALLAS SEMICONDUCTOR MAXIM
PROPRIETARY INFORMATION
TITLE:
PACKAGE OUTLINE, QSOP .150", .025" LEAD PITCH
APPROVAL | DOCUMENT CONTROL NO. 21-0055 | REV. E | 1/1

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